DLM®
Teaching Resources
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DEMOLITION DIVISION-APPLE
L1400

DEMOLITION DIVISION

L1410

Apple Computer, Inc. makes no warranties, either express or implied, regarding the enclosed computer software package, its merchantability or its fitness for any particular purpose.

DISKETTE INSTRUCTIONS

GETTING READY

1. Read all the instructions thoroughly.
2. Equipment needed: Apple* computer (48K, Applesoft), 1 disk drive, monitor (TV).
3. Check to be sure that system components are connected correctly and plugged into wall outlet.
4. Turn volume all the way down on monitor.
5. Place diskette in drive.
6. Turn on computer; when drive begins to "whirr" and "in use" light on drive is on, snap door on drive closed.**
7. When loading, screen will display:
   —DLM logo for *ARCADEMICS* and name of program. *Adjust color.*
   —Copyright notice. *Adjust picture sharpness.*
   —**PRESS ANY KEY TO PLAY** appears. *Go to page 2 of instructions.*

HANDLING DISKETTES

1. Never touch the surface of the diskette (the part in oval shaped hole).
2. Never force diskette into drive.
3. Never put diskette in or take out of drive while "in use" light is on.
4. Avoid dusty areas.
5. Don't expose diskette to extreme heat or cold, direct sunlight, or magnetic field. Never place on top of monitor (TV) or on top of drive.
6. Operate computer with diskette in temperatures from 50° F to 122° F.
7. **To insert diskette into drive,** hold it by the label with thumb and forefinger; place diskette in the drive with label up.
8. Replace diskette in envelope after removing from drive and store upright.

**Program will load with computer with auto-start. If drive does not start, type PR#6 and press RETURN. Program will load.
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L1X15

GETTING SET

- Practice with the game yourself.
- When **PRESS ANY KEY TO PLAY** appears on screen, you can change game control options. Diskette is programmed:
  1. at skill level 7;
  2. for problems with numbers 0-9;
  3. to run 2 minutes per game;
  4. for keyboard use, not paddles.
- To change these game options:
  1. When **PRESS ANY KEY TO PLAY** appears, hold down **CTRL** key and press **P.**
  2. These game options will appear:

> 1. SKILL LEVEL (1...9) *Speed at which the game runs. 1 is slowest; 9 is fastest.*
> 2. PROBLEM RANGE 3, 6, 9. *Problems with numbers 0-3 (press 3); 0-6 (press 6); 0-9 (press 9).*
> 3. RUN TIME (min). *Games can run from 1 to 5 minutes each.*
> 4. PADDLE CONTROL. *Press* **Y** *for yes;* **N** *for no.*
> 5. EXIT GAME CONTROL. *Press* **5.**

3. Follow these directions as they appear on the screen:
   —PRESS NUMBER OF OPTION TO CHANGE *(number at the left of option).*
   —Flashing cursor will appear at the programmed level (number on right).
   —Type level you want of that option.
   —Program will change and relist options.
   —Change as many options as you want.
   —When all selections are made, press **5.**
   —**PRESS ANY KEY TO PLAY** will appear.
4. Game is ready to play. Go to page 3.

THINGS TO REMEMBER:

1. Press **CTRL P** to change options.
2. Press **5** to exit options.
3. You can load several computers with the same diskette by removing the diskette from the drive after game options are selected and using it to load the next system.
4. Game control options can be selected during a game by pressing **CTRL P** whenever scores appear on screen and diskette is placed in drive.

PLAYING

- THE GAMES. The object of each game is to destroy the problems with the correct answer before being "destroyed" by the problem. A complete description of each game is given on pages 6-8 of these instructions. Answering for each is:

  ALIEN ADDITION—problems move from top to bottom of screen. Answers placed in cannon at bottom that is moved from left to right to fire.

  MINUS MISSION—problems move from top to bottom of screen. Answers placed in robot at bottom that is moved from left to right to fire.

  METEOR MULTIPLICATION—problems move from all around the screen toward center. Answers placed in center; gun at center is moved either direction to fire.

  DEMOLITION DIVISION—problems move from left to right toward gun on left. Answers placed in gun to fire.

  ALLIGATOR MIX—matching answer to problem in both keyboard and paddle modes. Apples with problems move toward alligator with answer. Correct matches are made with designated keys.

  DRAGON MIX—matching answer to problem in both keyboard and paddle modes. Dragon's head is pointed at matching problem as answer appears to fire.

- ANSWERING WITH KEYBOARD. While playing the game, the player will:
  1. Place the answer in the answer graphic.
  2. Fire the answer at the problem.
  3. Move the answer graphic to the next problem.
  4. Repeat for all problems.

- ANSWERING WITH PADDLES. When paddle mode is selected, the answers appear automatically in the answer graphic. The player must match the answer to the correct problem.
  1. Determine which paddle controls the screen.
  2. Move answer to position to match problem by moving the dial knob on the paddle.
  3. Fire the answer by pressing the button on the paddle.

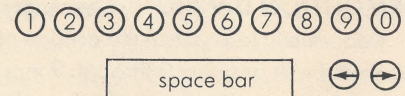
NOTES ON SKILL LEVEL

1. Noise and visual explosion occurs when problem reaches answer range before fired with correct answer.
2. Three explosions in a game terminates that game and scores recorded.

KEYBOARD KEYS TO USE

- Each game has several designated sets of keys that can be used for playing the game. THE GAME OPERATES WITH ANY COMBINATION OF THESE KEYS.

- **OPTION A:**



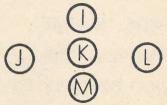
1–0 number keys = place answer

← (left arrow) = moves answer left; counter-clock; down

→ (right arrow) = moves answer right; clockwise; up

space bar = fires

- **OPTION B:**



J = moves answer left; counter-clock; down

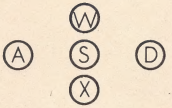
L = moves answer right; clockwise; up

K = increases answer number

M = decreases answer number

I = fires

- **OPTION C:**



A = moves answer left; counter-clock; down

D = moves answer right; clockwise; up

S = increases answer number

X = decreases answer number

W = fires

- TERMINATING GAME. A game can be stopped at any time during play by pressing **T** key. A game is also terminated when player fails to answer in allotted time 3 times in one game.

- SCORES. After each game, scores appear.
  - —Scores show hits and misses for current (last game played) and highest and lowest of all games played.
  - —Scores continue to be recorded until computer is shut off or **RESET** key pressed.
  - —Misses recorded *only* when wrong answer fired; *not* for failure to answer in time.

WHAT IF . . .	THEN . . .
• Program does not load when computer is turned on . . .	. . . this means you do not have autostart in your Apple. Type **PR#6** and press **RETURN.**
• Program freezes on screen . . .	. . . type **T;** scores will appear. Pressing any key will start a new game.
• **RESET** key is pressed . . .	. . . all scores are erased; game options return to programmed ones; drive will "whirr." Hold down **RESET** key until drive stops. Replace diskette in drive. Type **PR#6** and press **RETURN.** Program will reload.
• Blank screen continues when loading . . .	. . . check all connections, especially input to monitor.
• Computer is shut off during game . . .	. . . game options return to programmed ones; all scores are erased. Replace diskette in drive. Turn on computer. Program will reload.
• **CTRL P** is pressed without diskette in drive . . .	. . . drive will make "klunking" sound. After options made, game will start immediately.

WARRANTY. Diskettes replaced at no cost within 6 months of purchase if defective. Send with invoice number and account number to: DLM Returns.

SERVICE. For any difficulty not explained herein, call 800/527-4747 (in Texas 800/442-4711) and ask for **Toby.**

ALIEN ADDITION provides practice in addition of numbers 0 through 9 in an "alien invader" theme. Invading spaceships with problems move down from the top of the screen toward a laser cannon on a platform at the bottom. Answers are placed in the cannon to "equalize" the invader with the correct answer. If a spaceship reaches the cannon range before equalized with the right answer, the cannon is exploded in an "atomic" cloud. Answers are placed in cannon using designated keys; when paddle option is selected, answers appear and must be matched to problem. Hits and misses are recorded on the terrain at the bottom of the screen.

MINUS MISSION provides practice in subtraction of numbers 0 through 9 in a "creeping slime" theme. A large green slime at the top of the screen drips blobs of slime with problems toward a robot at the bottom. Answers are placed in the robot and then robot is activated to fire two laser beams to destroy the slime problem. If the slime reaches the robot range before being destroyed by the correct answer, the robot is disintegrated in a cloud of dust. Answers are placed in the robot using designated keys; when paddle option is selected, answers appear and must be matched to problem. Hits and misses are recorded in the large slime at the top of the screen.

METEOR MULTIPLICATION assists students in the multiplication of numbers 0 through 9 in a "meteor shower" format. Large meteors with problems move toward a large star station in the center of the screen. Answers to the problems are placed in the center of the station, station gun is aimed, and gun is fired to disintegrate the meteor. If a meteor reaches the star station before being disintegrated with the correct answer, the meteor shatters it in a highly graphic and sound explosion. Answers are placed in star station using designated keys; when paddle option is selected, answers appear and must be matched to problems. Hits and misses are recorded at the bottom of the galaxy.

DEMOLITION DIVISION gives students an opportunity to practice the division of problems with answers 0 through 9 in a wargame format. Tanks moving from the left side of the screen with problems fire, destroying a wall surrounding the guns on the right as they move toward the guns. Answers are placed beside the gun and fired at the approaching tank. If the answer is smaller than correct, the fire falls short of the tank; if larger, it falls beyond; if correct, it destroys the tank. If the tank reaches the gun before being destroyed by the number fired, the tank destroys the gun. Answers are placed in guns using the designated keys; when paddle option is selected, answers appear and must be matched to problems. Hits and misses are recorded in bunkers at the bottom of the screen.

ALLIGATOR MIX will help students increase their skill in both adding and subtracting numbers 0 through 9 by feeding alligators in a swamp. As they appear in the swamp, apples with problems move toward the mouth. Answers appear in the stomach of the alligator. As the apple problem approaches, the player must determine if the answer is correct. If so, the player opens the mouth with designated key or paddle and feeds the alligator. If fed an incorrectly-matched problem, correctly-matched one, or not fed a correct problem, the alligator will respond. If a no-match is correctly determined, the apple spins away. Five alligators will appear in the swamp in a single game, each fed faster, and will be presented 10 apples. Hits and misses are recorded in the swamp at bottom of screen.

DRAGON MIX provides practice in multiplication of numbers 0 to 9 and division of problems with answers 0 through 9 using a "protective dragon" theme. A large dragon on the right of the screen is protecting the city behind her from various invading forces with problems in them. Answers appear in the center of the dragon. The player matches the answers to the appropriate invader by aiming the head at it and fires using designated keys or paddle. Fire shoots from the dragon's mouth. If correct match, the invader is destroyed. If not, the invader keeps coming toward dragon. If the invader reaches dragon before being destroyed, it will pass into the city and explode. Hits and misses are recorded on the road leading to the city at the bottom of the screen.

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APPLE II+/IIe

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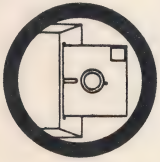
Precision surface.
No fingers, please!



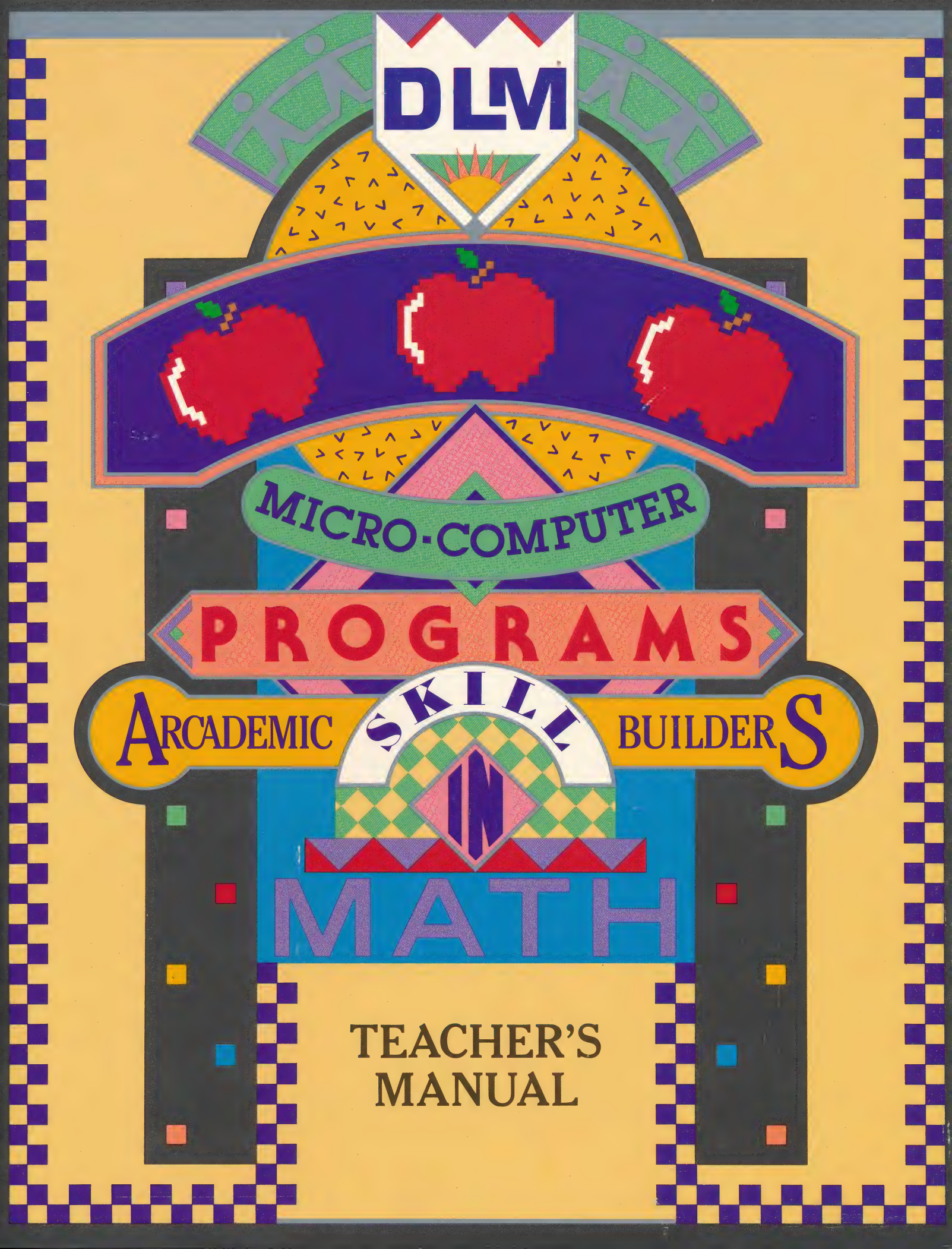
For your disk's sake
(and the system's, too)
insert disk carefully.

Magnetic fields erase.
Keep them far away.

Keep it safe—
in the jacket
when not in use.

Bending and folding
may damage.
Handle with care.

Keep disks comfortable.
Store at: 10° to 52° C.
50° to 125° F.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ARCADEMIC SKILL BUILDERS IN MATH

Teacher's Manual

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DEVELOPMENTAL LEARNING MATERIALS
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INTRODUCTION

ARCADEMIC SKILL BUILDERS IN MATH features the combination of microcomputer software and supplementary print materials to present a TOTAL APPROACH to learning basic arithmetic facts. The programs stem from experience, systematic observations, and research in attempting to understand student learning in school and social situations. This program incorporates the advantages of current electronic and educational technology to provide educators with a challenging fresh approach to teaching and learning.

The microcomputer software in this package features fast action, colorful graphics, and compelling arcade game format to both motivate and teach students arithmetic facts. The supplementary flashcards and worksheets allow additional individualization and practice for building skills which can later be challenged by the computer game. The use of the Progress Chart allows both teacher and student to systematically record performance information, observe changes in performance, and to make performance-based decisions about immediate and long term curriculum needs. The collaboration between student and teacher offers the teacher the opportunity to become the "manager" of student learning rather than the tutor.

The format of the Progress Chart and its use is an adaptation of a measurement system called *Precision Teaching* developed by Dr. Ogden Lindsley of the University of Kansas. Students or followers of precision teaching will note that not all of the features of it have been accounted for on the Progress Chart or in our recommended use; they will also note that many of the features of the computer software reflect strategies encompassed in the precision teaching mode. We gratefully acknowledge Ogden's contribution to these games as well as to the broader field of education.

ARCADEMIC SKILL BUILDERS IN MATH is an innovative, total approach to teaching basic academic skills incoporating the features of electronic arcade games and refreshing new educational practices that will motivate, intrigue, and teach your students.

RATIONALE

The rationale behind *ARCADEMIC SKILL BUILDERS IN MATH* emerged as a challenge to make certain aspects of classroom instruction as effective in creating persistance and involvement as observed in arcade game players. The result is a *total package* that incorporates the features of electronic arcade games with proven educational technology to provide a fresh new approach to teaching.

The **success in learning** usually means preventing the student from being discouraged by making too many mistakes. *ARCADEMIC SKILL BUILDERS* also emphasizes success; but *success is reflected by improvement.* Thus, high error rates are important in early stages of learning so that improvement is maximized. A preferred strategy in this program is to start students where they "aren't"—at a level where considerable number of errors are made and then are moved back or ahead as their performance requires.

Meeting the **needs of individual students** is a consideration of the program; however, the emphasis is in making the student "want" to learn. Once the needs are apparent, as are mastering basic arithmetic facts, the important consideration for optimal learning is to get the student to want to learn. These programs are written to do that.

Obtaining results of a **high rate of learning** requires structured, rapid, and disciplined responding. The *ARCADEMICS* approach requires rapid controlled responses through structure, highly motivational levels, excitement and involvement. Students must employ strategy under exciting circumstances to make rapid responses while being provided immediate feedback.

The games and strategies for using the games provided in this program are best represented by three motivational features—improvement, fast action, and increasing levels of difficulty.

Improvement. Poor performance in these games is not viewed by players as failure but as a challenge to improve. Improvement comes through two means, familiarity and strategy. As the player grows familiar with the events, he/she is able to develop and implement strategies to reduce negative consequences and improve performance. The major improvement comes from the student learning arithmetic facts.

Fast Action. Requiring a high number of responses in a short period of time is motivational and requires good performance. The individual has no time for interfering and distracting thoughts without serious penalty.

Increasing Levels of Difficulty. With *ARCADEMICS* routine drill takes on an aura of excitement and challenge with the games and strategies that increasingly require the student to face a more difficult situation just as a goal is accomplished. Such a challenge leads students to maximum proficiency in math facts.

In summary, the *ARCADEMICS* total approach is based on a philosophy that includes these principle points:

- Students respond to challenge and errors can be viewed as opportunities to improve rather than as indication of failure.
- Needed repetitious drill can be as fun and as stimulating as procedures and methods typically associated with the higher order aspects of learning.
- Having unlimited ceiling on performance will help the student reach his/her maximum level of proficient performance.
- Feedback on the nature and effectiveness of the student's responses are better able to implement performance and instructional strategies which facilitate improvement—the use of responses on the screen in charting progress.

PURPOSE

The overall purpose of *ARCADEMIC SKILL BUILDERS IN MATH* is to assist students in learning basic arithmetic facts of addition, subtraction, multiplication, and division through motivational practice. Such practice will provide the students with consistent recall of these facts in more complex math operations and in everyday situations.

The program will work with students of all ages requiring practice in the arithmetic facts using numbers 0 through 9. It can be used as a separate program in teaching these skills or as supplemental to programs within the curriculum.

Following extensive drill with materials in this package, the student will be able to:

- correctly write or say answers to the basic facts problems in the package at 40-90 responses per minute with 100% accuracy without using finger counting, visual aides, or manipulatives.
- correctly compute the basic facts included in the program within individual problems involving more complex processes.
- correctly answer basic facts included in the program in applied situations such as making change, determining distances, etc.

COMPONENTS

Each *ARCADEMIC SKILL BUILDERS IN MATH* package includes a Teacher's Manual, a 5¼" floppy diskette (Apple*) with an Instruction Sheet, a set of twelve blackline masters, and a deck of 52 flashcards. These components work together to present you with a total teaching strategy for unique student learning of basic arithmetic facts.

This **Teacher's Manual** provides the overall philosophy behind the package and specific directions for using the package. Each specific step in the strategy has complete explanation and directions for the implementation of the strategy. These steps include setting aims for students in the program, monitoring and recording the student's progress, charting and interpreting student progress, and strategies for improving student progress. This manual also provides you with information for generalizing the learning and adaptations for using the components in the package.

The set of **blackline masters** provides you with copies of worksheets of problems and record keeping sheets. The masters can be used for making copies on a direct copier machine or to make masters for use on a spirit or liquid-type process duplicator. Included in this set of blackline masters is a set of nine **worksheets** of problems which correspond to the problems appearing in the microcomputer game. These worksheets are organized into three levels of problems just as the computer game is. Worksheets 1 through 3 contain problems with numbers 0 through 3; Worksheets 4 through 6 contain problems with numbers 0 through 6; and Worksheets 7 through 9 contain problems with numbers 0 through 9. The three worksheets for each problem range have basically the same problems but have them arranged in different order to prevent the student from memorizing answers sequentially. The worksheets are clearly marked by number, thus indicating problem range. The purpose of these worksheets is to provide supplemental material for written drill and practice of the facts. While they can be used in the best way suited for specific students, activities for their use have been given in this manual under the Directions for Use section.

The blackline masters also include three types of record keeping forms. The **Student Record Sheet** is to be duplicated for the student to record the hits and misses per game played on the microcomputer. These sheets can be used for recording 10 games per day for five days. At the bottom of the daily column is space for the student to record the highest and lowest numbers for hits and misses for all games played that day. The student should turn this sheet in to you at the end of playing time each day for your charting.

The **Progress Chart** for games played on the microcomputer has space for your charting the student's progress across ten weeks. Space is provided at the top of this chart for recording the Aim(s) for individual students on the microcomputer games. Given the time in which the student reaches the aim set, space is provided for recording five aims.

The third record keeping sheet is the **Strategies for Improvement** sheet. This sheet can be used across the program for recording specific plans for helping the student improve his/her performance on the microcomputer game. This sheet provides space for the date the strategy was started, the description of the strategy, and comments on the results of the strategy.

The **microcomputer diskette** in this package has the appropriate math game, one of the six formats included in the entire package. The Instruction Sheet with the diskette provides you with step-by-step directions for using and handling the diskette and for playing the game. The overall objective for each microcomputer game is for the student to build correct responses (hits) and minimize incorrect ones (misses). The microcomputer games are:

*Apple is a trademark of Apple Computer, Inc.

ALIEN ADDITION provides practice in addition of numbers 0 through 9 in an "alien invasion" theme. Invading spaceships with addition problems move down from the top of the screen toward a laser cannon on a platform at the bottom. Answers are placed in the cannon to "equalize" the invader with the correct answer. If a spaceship reaches the cannon range before equalized with the right answer, the cannon is exploded in an "atomic" cloud. Answers can be placed in the cannon and firing controlled by designated keyboard keys. When paddle selection is made, answers appear automatically in the cannon and the player must match the answer to the appropiate problem by moving the cannon before firing. Hits and misses are recorded on the terrain at the bottom of the screen.

MINUS MISSION provides practice in subtraction of numbers 0 through 9 in a "creeping slime" theme. A large green slime at the top of the screen drips blobs of slime with subtraction problems toward a robot at the bottom. Answers are placed in the robot and then the robot is activated to fire two laser beams to destroy the slime problem. If the slime reaches the robot range before being destroyed by the correct answer, the robot is disintegrated into a cloud of dust. Answers can be placed in the robot and firing controlled by designated keyboard keys. When paddle selection is made, answers appear automatically in the robot and the player must match the answer to the appropriate problem by moving the robot before firing. Hits and misses are recorded in the large slime at the top of the screen.

METEOR MULTIPLICATION assists students in the multiplication of numbers 0 through 9 in a meteor shower format. Large meteors with multiplication problems in them move from all around the screen toward a large star station in the center of the screen. Answers to the problems are placed in the center of the star station, the station gun is aimed at the approaching meteor, and the gun is fired to disintegrate the meteor. If a meteor reaches the star station before disintegrated with the correct answer, the meteor hits the station and shatters in a highly graphic and sound explosion. Answers are placed in the star station and gun moved and fired by designated keyboard keys. When paddle slelection is made, answers appear automatically in the star station and the player must move the gun to match the answer to the appropriate problem before firing. Hits and misses are recorded in the galaxy at the bottom of the screen.

DEMOLITION DIVISION gives students an opportunity to practice the division of problems with answers 0 through 9 in a wargame format. Tanks moving from the left side of the screen with problems fire, destroying a wall surrounding the guns on the right as they move toward them. Answers are placed beside the gun and fired at the approaching tank. If the answer is smaller than correct answer, the fire falls short of the tank; if the answer placed is larger than correct answer, the fire falls beyond the tank; and if the answer is the correct one, it destroys the tank. If the tank reaches the gun before being destroyed by the number fired, the tank destroys the gun. Answers are placed next to the guns using the designated keyboard keys. When paddle selection is made, answers appear and must be matched to the problem before firing. Hits and misses are recorded in bunkers at the bottom of the screen.

ALLIGATOR MIX will help students increase their skill in both adding and subtracting numbers 0 through 9 by feeding alligators in the swamp. As alligators appear in the swamp, apples with addition and subtraction problems move toward the alligator's mouth. Answers appear in the stomach of the alligator. As the apple with the problem approaches the alligator's mouth, the player must determine if the answer in the alligator is the correct one for the approaching problem. If so, the player opens the alligator's mouth by pressing one of the designated keys or paddle option to allow it to eat the apple. If the alligator is fed an incorrectly-matched problem, it will suffer the effects of a "bad" apple; if a correct match is made, the alligator will tell the player how good the meal was. If the student misses giving the alligator a good apple, it will grumble. If a no-match is correctly determined by the player, the apple will spin and disappear. Five alligators will

appear in the swamp in a single game and be fed ten apples each. The speed of the "feeding" of the alligators increases as more alligators appear. Hits and misses are recorded in the swamp at the bottom of the screen. This program is especially good for generalization of both addition and subtraction skills.

DRAGON MIX provides practice in both multiplication of numbers 0 through 9 and division of numbers with answers 0 through 9 using a "protective dragon" theme. A large dragon on the right of the screen is protecting the city behind her from various invading forces. The different types of spacecraft have multiplication and division problems in them as they approach the city. Answers appear in the center of the dragon. The player matches the answer to the appropriate problem-carrying spacecraft by aiming the dragon's head at it, and then fires by pressing one of the designated keys or paddle option. If a correct match is made, the fire shot from the dragon's mouth will destroy the invader. If a wrong match is made, the invader will keep coming toward the dragon. If the invader reaches the dragon without being destroyed by the correct answer, it will enter the city and explode. Hits and misses are recorded on the road leading to the city at the bottom of the screen.

Each diskette is programmed so that you can change the parameters of the game: the skill level of the game (speeds for 1 to 9 at which the game runs); the problem range of the numbers used in the problems (includes problems with numbers 0-3, 0-6, or 0-9); the number of minutes each game runs (1-5 minutes); and whether paddles or keyboard is used in playing the game.

The deck of 52 **flashcards** included in this package have problems corresponding to the diskette game and worksheets. The problems appearing on one side and the answer on the other side are in the same four-color theme as the game on the microcomputer diskette. These make the flashcards identifiable to each package and enhance their attractiveness and motivation value to the students.

DIRECTIONS FOR USE

Teacher Preparation. While the games on the diskette can be used separately, the strategy designed for the program provides a total approach to building skills in the arithmetic functions of addition, subtraction, multiplication, and division. This section outlines the steps in the process and is followed by detailed explanation for completing each step.

To prepare for use of *ARCADEMIC SKILL BUILDERS IN MATH,* you should read this teacher manual thoroughly. It is best to play the skill building game on the microcomputer before the student does to get direct experience with it. Your experience in playing the game will provide you an understanding of the skill levels of the game. Also before starting the program, you should duplicate the worksheets and various progress sheets from this manual and have them ready before any sessions start.

Program Procedure. You will establish individual plans for each student using the program depending upon individual needs. The basic procedure for using these programs is:

STEP 1: Establish aims for the student(s) in the program.

STEP 2: Explain the procedure and establish schedules.

STEP 3: Monitor and record student progress.

STEP 4: Chart student progress.

STEP 5: Interpret student progress.

STEP 6: Establish strategies for improvement if necessary.

STEP 7: Set new aims for student(s).

STEP 8: Provide generalization activities.

STEP 9: Consider adaptations of program.

STEP 10: Repeat steps for additional games.

STEP 1:

Establish Aim(s)

Based on the *ARCADEMICS* philosophy, establishing an aim for the student in the microcomputer games is an excellent motivational technique. Establishing an aim for the student means setting a certain number of hits and misses at a given skill level in one game. The diskette is programmed for a two minute game; this seems to be the best time limit for proficiency and motivation in the game. The time of each game can be changed as per the instructions with the diskette. It is important to be consistent about the time per game for building skill and charting progress. By using the same time per game, the scores represent a consistent rate or frequency of hits and misses. This increases the degree of comparability from score to score. (The same should be true in using flashcards and worksheets in a timed session. If you choose to time the student's work with flashcards or worksheets, it is recommended that one or two minute timings be used.)

It is difficult to give guides for establishing aims for your students playing the game. It is recommended that no aim be set at less than 40 hits and more than 5 misses per 2 minute game at the given level. To set specific aims for a student to reach, you will need to experiment with the game. One way of setting an aim for the student is to play the game yourself and determine an appropriate aim based on your own performance. Another excellent source for setting aims is a student who is already quite proficient with the particular facts. Allow the student to play the game a few times until he/she is used to operating the controls and has developed some strategy for playing. You can then base aims of other students on this performance. Setting intermediate goals over several periods of time can be more motivating to certain students. For example, for a student whose performance is quite low and/or progress is slow, you may want to set intermediate aims below the final performance aim and gradually increase the aim as the student reaches each one.

Space is provided at the top of the Progress Chart for recording the aim of the student. There is space for recording the number of hits, misses, at the skill level, and date by which the aim should be reached.

AIM: _____ HITS _____ MISSES at _____ Skill Level by _____ DATE

The skill level of each game ranges from 1 to 9, with 1 being the slowest and 9 being the fastest. The game is programmed at skill level 7, but can be changed as per directions with the diskette. After you and the student experiment with the game, you will be able to set appropriate targeted skill levels for each student. Field testing proved that once students reached high proficiency at skill level 7, playing the game at the two higher skill levels, 8 and 9, proved good reinforcement without setting an aim at these skill levels which are timed for extremely rapid presentation of the facts.

The game is also programmed for problems ranging from 0 through 9. This too can be changed in the game control options on the diskette. If you have a very young student using the program, or a student who needs to gradually work through the problem range, you might want to set aims for numbers 0 through 3 first, move on to an aim for numbers 0 through 6, and finally problems using numbers 0 through 9. (If so, you may want to mark these on the calendar days at the bottom of the Progress Chart.)

After determining the aim for the student and recording it at the top of the Progress Chart, you may want to indicate the aim on the Progress Chart as a visual reference for the student. The aim performance levels can be marked on the graph by placing a capital **A** for the number of hits and an inverted capital **A** (**∀**) for misses on the performance level lines at the aim date. (This is shown on the Progress Chart in Step 4.) Space is provided for more than one aim per Progress Chart to utilize all ten weeks on which you can record on the chart.

STEP 2:

Explain Procedure

Depending upon the student's experiences with the microcomputer, you will need to spend some time explaining the object of the game being played and the way in which the game operates. Explanation of these are given step-by-step on the Instruction Sheet that comes with the diskette. After explaining these to the student and establishing a schedule for the work at the microcomputer, observe the student for a few minutes to make sure he/she is operating the game correctly. You may also want to spend time demonstrating the way in which the game scores are recorded on the Student Record Sheet, discussing the use of the Progress Chart, and involving the student in actually setting the aim for the game.

STEP 3:

Monitor and Record Student Progress

The student should be given a Student Record Sheet before beginning each session at the microcomputer. Explain at the end of each game, the student is to record the hits and misses for that game. These are recorded in the scores on the screen as the *Current* hits and misses—the last game played. These should be recorded per game played as space is provided on the Student Record Sheet. At the end of the session which will probably include several games played, the student should record the *highest* and *lowest* numbers of hits and misses as shown on the screen scores. Space at the bottom of each daily column on the Student Record Sheet is provided for recording these numbers.

Monitoring the student's progress should include an occasional observation of the student using the microcomputer as well as collecting the Student Record Sheet at the end of each session.

STEP 4:

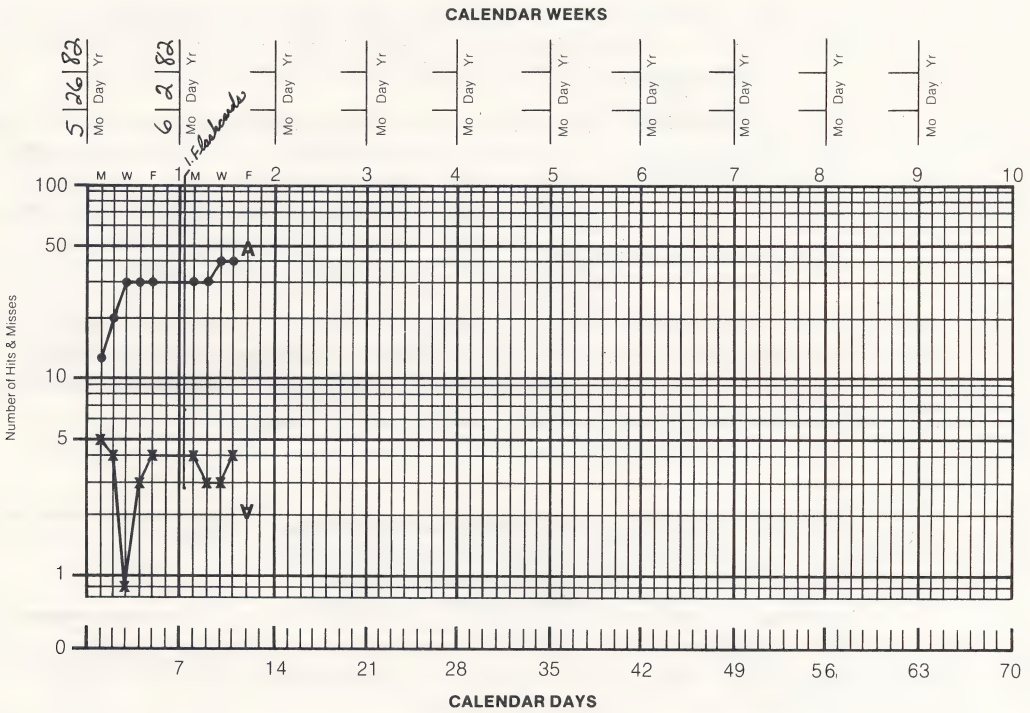
Chart Student Progress

The Progress Chart used in *ARCADEMICS* is technically called a semilogrhythmic graph. This type of proportional chart is used to note the proportional changes in a student's performance. More importantly it can be used to note trends in the performance from which decisions on strategies for improvement can be made. It also predicts more clearly and easily if the student is likely to reach the aim set. It provides visual feedback of progress to both you and the student. It can also be an effective means of reporting to parents on the student's performance. Such a proportional graph provides comparisons of student growth more fairly.

As seen on the Progress Chart, the vertical lines are the daylines—the dates for charting progress for that day. Space is provided to chart the student's progress across seventy calendar days. The heavy dark lines represent Sunday and the remaining vertical lines represent the other six days in the week. Space is provided at the top of the chart to write in the date of the week you are charting. The calendar date of the Sunday before the student starts the program should be noted in the first date slot.

KEY:

- • Hits
- **X** Misses
- **A** Hits aim
- **∀** Misses aim



The horizontal lines on the chart are for charting the number of hits and misses in a range from 1 to 100. After locating the correct dayline, you will chart the hits and misses on the appropriate horizontal line for that date.

As the Key indicates, chart the number of hits with a dot (•) and the number of misses with a small **x** at the appropriate point. If the student's score does not correspond to a value marked on the chart's horizontal lines (10, 50, etc.), the score must be plotted on an estimated place for that value. As seen on the sample Progress Chart, a score of 15 is placed half way between the 10 and 20 lines on the chart for the first Monday. When a student obtains a score of zero (0), the number should be marked below the score of 1 for that day, as has been done on the third day of the sample chart for misses. Also note that the Aims for both hits and misses have also been recorded on the sample chart with the **A** for hits and the **∀** for misses.

Since the student will probably play several games during a given day, it is important to be consistent in charting the score for that day. The research and field test indicate that CONSISTENTLY RECORDING THE SAME TYPE OF SCORE is extremely important. The teachers in our field testing charted scores for the day in a variety of ways—all with equal success. In charting scores, you can:

- Chart the game with the highest number of hits.
- Average the number of hits and misses across all games played and chart those numbers.
- For slower students or students who are unfamiliar with the microcomputer, you might chart a specific game that would represent their highest efficiency at the game, such as game 3 out of 5 played.

No matter which method you select to chart progress, be sure to chart the number of hits and misses on a consistent basis.

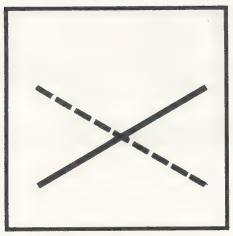
Once you have charted the scores for several days, connect the hits and misses as shown on the sample chart. The charted performances will be important in interpreting the scores for establishing strategies for improvement and new aims.

NOTE: The hits and misses *are not* connected across weekend dates if the student did not play the game on those days.

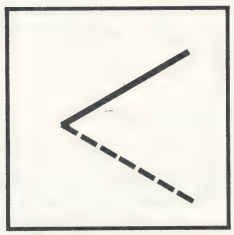
STEP 5: Interpreting the graph lines of hits and misses (trend lines) is important in setting strategies for improvement and establishing new goals. This should be done at the end of one or two weeks of performance.

Interpret Student Progress

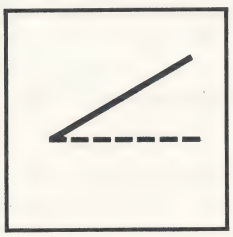
Plotting and interpreting both the correct (hits) and error (misses) responses will enable you to see the degree of accuracy the student is achieving as well as the absolute performance level. By interpreting both of these trend lines, you will have a learning picture from which you can plot strategies for further learning. The displays of trend lines below represent ten possible learning pictures showing the different types of performance patterns. For each picture, we have listed a description of the picture and indicated possible instructional strategies for each. (Because the chart is proportional, these learning pictures are useful at any given performance range on the graph.) The solid line (——) indicates correct responses or hits and the broken line (----) represents error responses or misses.



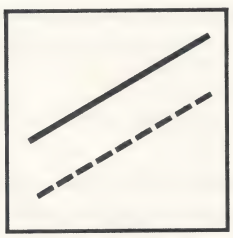
A. Hits are lower than misses, but misses are decreasing and hits are increasing; optimal learning pattern. *No change necessary.*



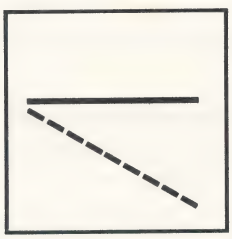
B. Hits are accelerating and misses are decelerating; excellent learning pattern. *Be ready to move to next difficulty level.*



C. Hits accelerating and misses maintaining: *consider teaching to errors.* If errors are low or at zero, *move to a harder level* when aim is met on hits.

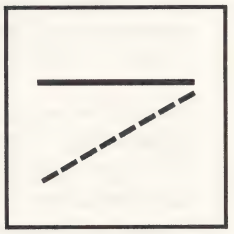


D. Hits are accelerating and misses accelerating: speed is increasing but accuracy is not. *Teach to errors or assign penalty to the errors.*

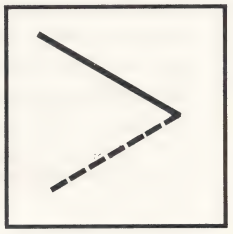


E. Hits are maintaining and misses are decelerating: accuracy improving, but improvement in hits needs to be stimulated. *Check to see if all prerequisite skills or concepts are clear; consider rewarding for increasing correct performance.*

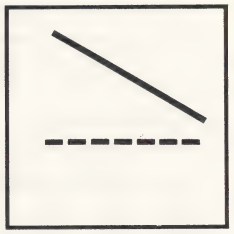
F. Hits are maintaining and misses are maintaining: if hits are high and misses are low, *move to a more difficult step.* If not, *consider moving to an easier step or reward for improvement.*



G. Hits are maintaining and misses are increasing: *teach to errors,* consider moving back to an easier step.



H. Hits are decreasing, misses are increasing: the program is either getting too hard too quickly and the *student needs to move to an easier level* or motivation is very low and *an incentive system is needed.*



I. Hits are decreasing, misses are maintaining: *check for missing prerequisite skills or concepts, consider moving to easier level.*

J. Hits are decreasing and misses decreasing: program is too difficult. *Move to an easier level.*

In describing instructional strategies for each of the learning pictures, four general strategies were suggested relevant to the type of pattern each picture displayed. These strategies should be implemented as follows:

- *Train to errors.* If errors are related to specific facts, provide instruction and practice on those facts. If the errors are motoric and related to the manipulation of the keyboard or microcomputer, provide guided directions at a slower level for several games.
- *Provide consequences for performance.* Reward correct performance or improved correct performance and/or assign penalties for errors.
- *Move to an easier level.* Move the student back to games with EITHER easier problem range (i.e. from problems with 0-6 numbers to 0-3 numbers) OR to an easier skill level (i.e. from level 5 to level 4).
- *Move to the next level.* Advance the student to the next problem range level and set a new aim OR move to the next skill level and set a new aim.

STEP 6:

Establish Strategies for Improvement

Once the Progress Chart trend lines indicate additional strategies for improving the scores on the game, you will need to select a specific strategy. A separate blackline master is provided for recording the strategies selected for two aims that you select. This sheet provides space for recording up to five different strategies. It seems unlikely that more than five different strategies will need to be tried before one is identified that successfully affects student progress. Research suggests that over 90% of the strategies which work are identified by the third try.

You may also want to indicate a specific strategy on the Progress Chart. This can be done by making a vertical line on the graph in the white space immediately in front of the dayline on which it is introduced. (This has been done on the sample Progress Chart in Step 4.) By extending this vertical line above the top of the graph, you can write in an abbreviation of the strategy. Marking the strategy on the Progress Chart will provide a visual relationship between strategies and the performance of a student. (It is best to not connect hits and misses scores across a strategy line.) Space is provided on the Strategies for Improvement sheet to date the strategy, describe it, and record any comments about the effectiveness of it. This will help in planning other strategies with other games or for other aims.

The supplementary materials in this program can be used with specific procedures and activities to implement the general strategies suggested by the learning pictures. The following specific suggestions can facilitate student progress.

Using the Flashcards. The 52 flashcards in this package include the 52 problems that have been identified by math research as the most difficult. For working on different problem ranges (especially in training to error), you will need to sort out only those cards appropriate for the facts the student is concentrating on. There are several ways in which you can use the flashcards for helping students improve.

- The students can be given the cards to practice with individually.
- The student can be drilled with the flashcards with the assistance of a teacher, peer, or paraprofessional.
- The cards can be divided into appropriate problem range groups and given to the student to help prepare for the game. The student would be required to practice with the flashcards for two minutes prior to playing the game on the microcomputer.
- The student can be required to practice with the flashcards after playing the game on the basis of obtaining certain scores, such as fewer than 20 hits in any game or more than 10 misses in any game.
- The flashcards can be placed in a learning center in the classroom or math area. Explain that they are available and that the student can use them during free time to increase his/her scores.

- The flashcards can be used for team or individual games which provide practice for more than one student at a time. Incentives could be added by allowing team members or individuals with the most points during a game extra time on the microcomputer game.

Using the Worksheets. The nine worksheets provided for this program are divided by problem range. Three sheets are provided for each problem range. Worksheets 1 through 3 have problems using numbers 0-3 only; Worksheets 4 through 6 have some problems with numbers 0-3 but the majority of them are with numbers 4-6; Worksheets 7 through 9 have some problems with numbers 0-6, but the majority of them are with numbers 7-9. There are sixty problems on each worksheet. (The fraction at the right of each row of problems indicates the total number of answers through that row on the top of the fraction and the total number of digits in the answers through that row on the bottom of the fraction. If you choose to record the correct responses on a Progress Chart for the worksheets, you can either record correct answers or number of correct digits.)

The worksheets in this program can be used in several ways for helping students improve:

- Students can be given appropriate worksheets to practice with individually.
- The worksheets can be used as daily seat work or homework for students in the program.
- The worksheets can be required on the basis of certain scores obtained on the microcomputer game, such as fewer than 20 hits on any game or more than 10 misses in any game.
- The worksheets can be used to demonstrate mastery in any given problem range after reaching the aim on the microcomputer game. This aim of correct answers on the sheet should correspond to the aim of hits on the game and the aim of incorrect answers should correspond to that of the misses on the game in a selected period of time (usually one or two minutes).
- The worksheets can be used to assist in generalization of the problems used in the microcomputer games.

Tutorial Procedures. Using tutors can be especially beneficial to students in this program. A tutor can be any person other than you who assists a student with any component of the program, including older students, peers in the class, parents, or paraprofessionals. Some of the activities the tutor might use with the students are:

- Drilling the student in one-to-one situations with the flashcards.
- Timing the student's performances on the worksheets.
- Setting up and keeping scores on team games using the flashcards.
- Monitoring and recording those problems the student misses while playing the computer game to implement training to errors. The tutor could then drill the student using the chalkboard, a worksheet, or flashcards.
- Monitoring student use of a learning center which contains the *ARCADEMICS* materials.

Using Learning Centers. A learning center can be created in a small area of a room, usually arranged around the microcomputer. All materials available for individual practice should be arranged to be accessible to the students and times assigned in which the students can use the center. A check-in sheet should be there for students to record their time spent in the center and the activity in which they worked. It is important to record the time each student spends in the learning center to mark its effect on reaching the goal—an improvement strategy.

Using Incentives. Incentives can be implemented which will capitalize on the built-in incentives of the games themselves. One way for students to increase their performances in the game is through additional practice. Additional practice on the microcomputer could be earned by:

- Improvement on the game itself—especially reaching an aim early.
- Working extra time with the flashcards or worksheets.
- Being a reliable peer tutor with other students.
- Good behavior in the learning center or area where the microcomputer is located.
- Being responsible for making sure the microcomputer is shut off and unplugged at the end of each day.

Additional incentives could be given by developing and utilizing related materials that correspond to the game theme. Some additional incentives you might use are:

- Give students titles based on their level of progress on the game, i.e. Cadet, Ranger, Captain, Explorer, etc.
- Develop bulletin board displays which use the game themes and show student progress toward mastery. This could include a special bulletin board progress sheet which uses the game theme and monitors progress.
- Have students develop card games using the game themes.
- Have students make up additional worksheets for the games and have them trade worksheets for practice.
- Have students bring in math games that would help them practice the math skill.
- Provide students with certificates of achievement when they reach each aim. These could be plain certificates (as DLM #501) or ones you develop with themes corresponding to the game.

STEP 7:

Set New Aims

Using the information gained from the Progress Chart on the first aim set for the student, you will be able to more accurately set other aims for the students. It is important to remember that the games programmed at skill level 9 are beyond most student's ability to reach at a high number of hits. This programming is done to provide additional practice on the problems while providing motivation for the student to continue to practice these skills on the microcomputer game.

STEP 8:

Provide Generalization Activities

Once a student has reached an aim within a game at skill level 7, you may want to provide some activities in which the student uses the skills. The generalization will be apparent in the student's daily math performance. However, you may want to set up special activities that will demonstrate this use in practical applications. Such activities might include various ways of:

- making change.
- calculating mileage.
- calculating miles per gallon used by an automobile.
- measuring specific distances in the classroom.
- checking sales receipts from stores for accuracy.
- estimating various costs of groceries from newspaper ads.

STEP 9:

Consider Adaptations

DLM's materials are designed to be used flexibly as the student's needs and learning situation warrant. Each person working with this product is encouraged to adapt the materials in any way possible to ensure a successful learning experience for the student.

While this product is designed to be used on a one-student-per-strategy procedure, some variations could be made to make this a two-person approach or small group session. By loading two microcomputers with the same game, and same game control options, two students could start the game at exactly the same time and compete against each other in a two-person game situation.

Rather than concentrating on one specific game, and thus a specific arithmetic function, you may want to schedule work on more than one function in a given time frame. This could be done by having students work on addition for two days (Alien Addition), subtraction for two days (Minus Mission) and then with the combination of addition and subtraction (Alligator Mix) during a period of several weeks. The same could be done with multiplication (Meteor Multiplication), division (Demolition Division), and the combination (Dragon Mix).

In training specific functions, the last two programs combining functions, Alligator Mix and Dragon Mix, could be used as generalization and mastery testing after aims have been reached on each of the separate function games.

STEP 10:

Repeat Steps for Additional Games

The steps listed in this manual and the generalization and adaptation techniques should be repeated for each game that the student plays. Using the flashcards, worksheets, record sheets, and microcomputer games to help the student reach specific aims can be based on information gained on the first trials with the program.

DLM® DEVELOPMENTAL LEARNING MATERIALS
One DLM Park • Allen, Texas 75002

L1X30

IMPORTANT INFORMATION

New Features of the Arcademic Skill Builders in Math

INTRODUCTION

Several new features have been added to enhance the six Arcademic Skill Builders in Math titles for the Apple II+, IIe, and IIc.

- ***Game Analysis*** allows teachers and students to review game responses after each game. This feature presents the missed math problems and other game statistics to help identify the student's math strengths and weaknesses.
- ***Pupil Record System*** enables teachers to evaluate the progress of individual students or the entire class.
- ***Print Function*** allows teachers to print game analysis and progress records.
- ***Increased Game Content Range*** now includes numerals 0–12.
- ***Individualized Presentation*** allows students to practice problem math facts more frequently.

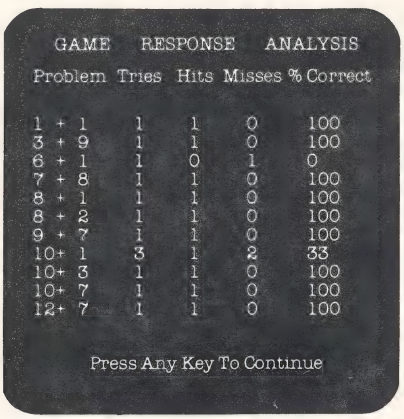
GAME ANALYSIS

After completing a game, students and teachers can review math problems presented during the game and analyze student responses to the problems. The Game Analysis identifies

- game time
- each math problem presented
- the number of times the student tried to solve each problem
- the number of hits (correct answers) and misses (wrong answers) for each problem
- the percentage of correct responses for each problem
- the projected number of hits per minute.

Using the Game Analysis Feature

To see the Game Response Analysis screen, press *1* for "Game Response" on the game SCORE SCREEN.



GAME RESPONSE ANALYSIS

Problem	Tries	Hits	Misses	% Correct
1 + 1	1	1	0	100
3 + 9	1	1	0	100
6 + 1	1	0	1	0
7 + 8	1	1	0	100
8 + 1	1	1	0	100
8 + 2	1	1	0	100
9 + 7	1	1	0	100
10+ 1	3	1	2	33
10+ 3	1	1	0	100
10+ 7	1	1	0	100
12+ 7	1	1	0	100

Press Any Key To Continue

PUPIL RECORD SYSTEM

Teachers can use the Pupil Record System to review the 20 most recent game scores for as many as 40 students. This feature allows teachers to keep accurate records of students' progress. Teachers can select class records or individual records for display on the computer screen or printer.

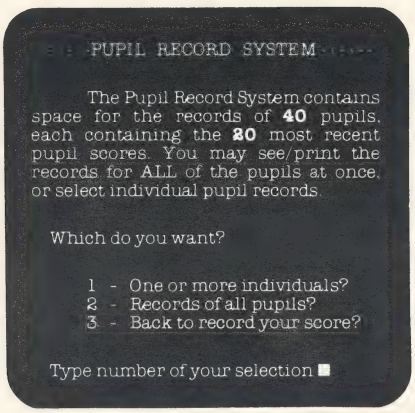
In addition to game scores, teachers can view

- game dates
- game time limit
- content range
- actual game time
- game speed
- hits and misses per minute
- projected hits and misses per minute

Using the Pupil Record System

To save game scores, students press *2* for "Save Score" on the game SCORE SCREEN, then follow screen instructions.

To view student records, teachers press *CTRL D* for "Pupil Record System" on the GAME INSTRUCTION screen. Then, follow screen instructions.


PUPIL RECORD SYSTEM
The Pupil Record System contains space for the records of 40 pupils, each containing the 20 most recent pupil scores. You may see/print the records for ALL of the pupils at once, or select individual pupil records.
Which do you want?
1 - One or more individuals?
2 - Records of all pupils?
3 - Back to record your score?
Type number of your selection

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STUDENT RECORD SHEET

Demolition Division

Student Name _____

DATE:					
GAME 1	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____
GAME 2	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____
GAME 3	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____
GAME 4	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____
GAME 5	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____
GAME 6	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____
GAME 7	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____
GAME 8	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____
GAME 9	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____
GAME 10	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____	Hits ____ Misses ____
TOTAL	Hits **H** ____ **L** ____ Misses **H** ____ **L** ____	Hits **H** ____ **L** ____ Misses **H** ____ **L** ____	Hits **H** ____ **L** ____ Misses **H** ____ **L** ____	Hits **H** ____ **L** ____ Misses **H** ____ **L** ____	Hits **H** ____ **L** ____ Misses **H** ____ **L** ____

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PROGRESS CHART

Demolition Division

Student Name_____

AIM: _____ HITS _____ MISSES at _____ Skill Level by _____ DATE

AIM: _____ HITS _____ MISSES at _____ Skill Level by _____ DATE

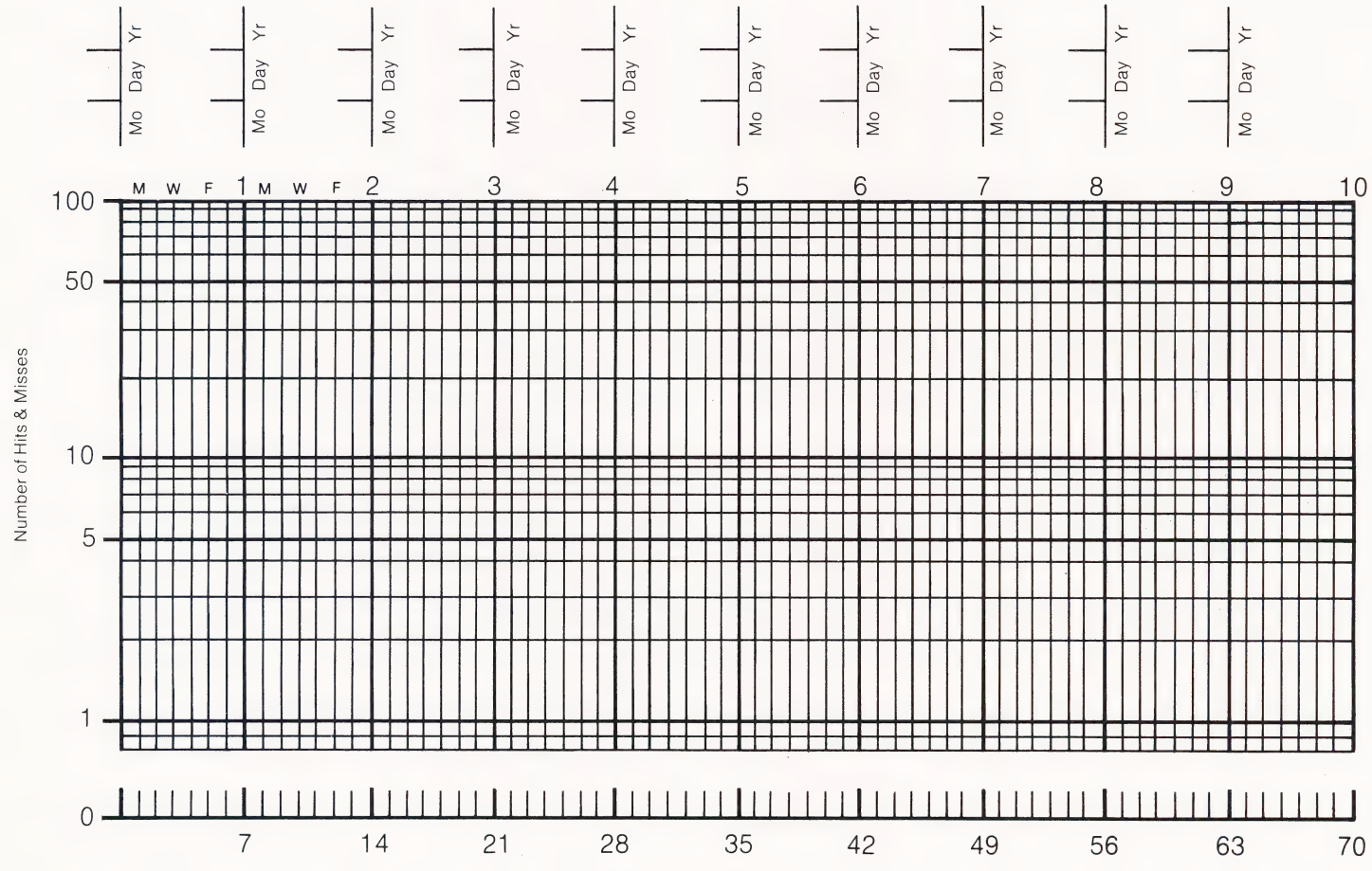
AIM: _____ HITS _____ MISSES at _____ Skill Level by _____ DATE

AIM: _____ HITS _____ MISSES at _____ Skill Level by _____ DATE

KEY:

- • Hits **A** Hits aim
- **X** Misses **∀** Misses aim

CALENDAR WEEKS



CALENDAR DAYS

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STRATEGIES FOR IMPROVEMENT

Demolition Division

Student Name _____

AIM: _____ HITS _____ MISSES at _____ Skill Level by _____ DATE

DATE	STRATEGY	COMMENT
1.		
2.		
3.		
4.		
5.		

AIM: _____ HITS _____ MISSES at _____ Skill Level by _____ DATE

DATE	STRATEGY	COMMENT
1.		
2.		
3.		
4.		
5.		

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WORKSHEET 1

Demolition Division

Student Name: _____ Date: _____ **CORRECT:** _____

ERRORS: _____

$2\overline{)0}$	$1\overline{)3}$	$3\overline{)0}$	$3\overline{)3}$	$2\overline{)4}$	$2\overline{)6}$	$3\overline{)9}$	$1\overline{)8}$	$3\overline{)6}$	$1\overline{)2}$	$\frac{10}{10}$
$1\overline{)1}$	$2\overline{)0}$	$1\overline{)0}$	$3\overline{)0}$	$2\overline{)2}$	$1\overline{)0}$	$1\overline{)3}$	$3\overline{)3}$	$2\overline{)6}$	$3\overline{)9}$	$\frac{20}{20}$
$1\overline{)2}$	$2\overline{)0}$	$3\overline{)0}$	$2\overline{)2}$	$1\overline{)8}$	$1\overline{)1}$	$3\overline{)6}$	$3\overline{)9}$	$2\overline{)4}$	$3\overline{)0}$	$\frac{30}{30}$
$2\overline{)0}$	$3\overline{)0}$	$3\overline{)9}$	$1\overline{)3}$	$2\overline{)6}$	$3\overline{)6}$	$2\overline{)0}$	$1\overline{)2}$	$2\overline{)4}$	$3\overline{)3}$	$\frac{40}{40}$
$2\overline{)2}$	$1\overline{)0}$	$1\overline{)1}$	$3\overline{)0}$	$2\overline{)0}$	$1\overline{)0}$	$1\overline{)0}$	$1\overline{)3}$	$3\overline{)0}$	$3\overline{)6}$	$\frac{50}{50}$
$1\overline{)2}$	$3\overline{)3}$	$1\overline{)0}$	$3\overline{)0}$	$1\overline{)0}$	$1\overline{)0}$	$2\overline{)0}$	$1\overline{)1}$	$2\overline{)3}$	$2\overline{)4}$	$\frac{60}{60}$

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WORKSHEET 2

Demolition Division

Student Name:_____ Date:_____ **CORRECT:** _____

ERRORS: _____

3)6	2)4	1)7	1)3	2)6	3)9	1)2	1)0	2)2	2)0	10/10
1)3	3)0	2)0	3)0	3)3	1)0	3)3	2)0	1)3	2)2	20/20
1)2	2)6	1)1	3)6	2)4	8)0	3)9	1)1	2)8	1)3	30/30
2)0	3)3	1)0	3)3	3)0	2)0	3)0	1)3	2)0	2)2	40/40
1)0	1)2	3)9	2)6	1)3	1)1	2)4	3)6	3)3	2)0	50/50
1)3	2)0	1)0	3)9	3)3	2)4	3)6	1)1	2)6	1)2	60/60

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WORKSHEET 3

Demolition Division

Student Name:_____ Date:_____ **CORRECT:** _____

ERRORS: _____

$3\overline{)9}$	$3\overline{)0}$	$2\overline{)4}$	$3\overline{)3}$	$1\overline{)3}$	$1\overline{)1}$	$2\overline{)0}$	$2\overline{)6}$	$1\overline{)0}$	$1\overline{)2}$	$\frac{10}{10}$
$3\overline{)6}$	$3\overline{)0}$	$1\overline{)7}$	$1\overline{)0}$	$2\overline{)0}$	$2\overline{)2}$	$2\overline{)4}$	$1\overline{)3}$	$2\overline{)0}$	$7\overline{)0}$	$\frac{20}{20}$
$3\overline{)0}$	$2\overline{)0}$	$3\overline{)6}$	$1\overline{)3}$	$3\overline{)3}$	$1\overline{)1}$	$2\overline{)6}$	$1\overline{)2}$	$3\overline{)0}$	$1\overline{)0}$	$\frac{30}{30}$
$3\overline{)9}$	$1\overline{)0}$	$3\overline{)0}$	$3\overline{)0}$	$3\overline{)6}$	$1\overline{)2}$	$1\overline{)0}$	$2\overline{)6}$	$2\overline{)8}$	$1\overline{)7}$	$\frac{40}{40}$
$1\overline{)3}$	$3\overline{)3}$	$2\overline{)4}$	$2\overline{)2}$	$3\overline{)9}$	$1\overline{)0}$	$3\overline{)0}$	$1\overline{)2}$	$2\overline{)6}$	$1\overline{)1}$	$\frac{50}{50}$
$3\overline{)3}$	$2\overline{)6}$	$3\overline{)6}$	$6\overline{)2}$	$3\overline{)0}$	$1\overline{)0}$	$2\overline{)0}$	$1\overline{)3}$	$2\overline{)4}$	$3\overline{)9}$	$\frac{60}{60}$

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WORKSHEET 4

Demolition Division

Student Name:_____ Date:_____ **CORRECT:** _____

ERRORS: _____

$3\overline{)12}$	$2\overline{)2}$	$4\overline{)20}$	$6\overline{)18}$	$6\overline{)36}$	$6\overline{)12}$	$6\overline{)0}$	$2\overline{)4}$	$5\overline{)15}$	$6\overline{)30}$	$\frac{10}{10}$
$2\overline{)10}$	$3\overline{)15}$	$6\overline{)24}$	$3\overline{)3}$	$1\overline{)4}$	$5\overline{)25}$	$5\overline{)20}$	$1\overline{)5}$	$1\overline{)6}$	$4\overline{)8}$	$\frac{20}{20}$
$4\overline{)24}$	$3\overline{)18}$	$2\overline{)8}$	$4\overline{)0}$	$2\overline{)12}$	$3\overline{)9}$	$5\overline{)10}$	$4\overline{)12}$	$5\overline{)0}$	$6\overline{)12}$	$\frac{30}{30}$
$1\overline{)6}$	$2\overline{)10}$	$3\overline{)15}$	$3\overline{)12}$	$1\overline{)4}$	$6\overline{)24}$	$4\overline{)8}$	$5\overline{)15}$	$3\overline{)0}$	$6\overline{)18}$	$\frac{40}{40}$
$5\overline{)10}$	$4\overline{)12}$	$2\overline{)6}$	$4\overline{)24}$	$2\overline{)12}$	$4\overline{)20}$	$1\overline{)3}$	$2\overline{)8}$	$4\overline{)0}$	$5\overline{)20}$	$\frac{50}{50}$
$5\overline{)0}$	$1\overline{)1}$	$1\overline{)5}$	$5\overline{)25}$	$6\overline{)30}$	$6\overline{)0}$	$5\overline{)30}$	$6\overline{)36}$	$3\overline{)18}$	$5\overline{)30}$	$\frac{60}{60}$

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WORKSHEET 5

Demolition Division

Student Name:_____ Date:_____ **CORRECT:** _____

ERRORS: _____

$4\overline{)12}$	$3\overline{)3}$	$6\overline{)18}$	$3\overline{)15}$	$2\overline{)8}$	$1\overline{)4}$	$6\overline{)24}$	$3\overline{)9}$	$2\overline{)10}$	$6\overline{)30}$	$\frac{10}{10}$
$6\overline{)0}$	$2\overline{)12}$	$3\overline{)18}$	$4\overline{)24}$	$5\overline{)10}$	$4\overline{)8}$	$1\overline{)2}$	$5\overline{)15}$	$6\overline{)12}$	$5\overline{)30}$	$\frac{20}{20}$
$5\overline{)25}$	$5\overline{)0}$	$1\overline{)5}$	$2\overline{)4}$	$5\overline{)20}$	$3\overline{)12}$	$4\overline{)0}$	$3\overline{)6}$	$4\overline{)20}$	$6\overline{)36}$	$\frac{30}{30}$
$1\overline{)6}$	$2\overline{)10}$	$1\overline{)5}$	$4\overline{)24}$	$3\overline{)18}$	$4\overline{)12}$	$5\overline{)10}$	$5\overline{)30}$	$6\overline{)12}$	$5\overline{)25}$	$\frac{40}{40}$
$6\overline{)24}$	$2\overline{)8}$	$3\overline{)12}$	$3\overline{)15}$	$2\overline{)10}$	$5\overline{)10}$	$2\overline{)6}$	$6\overline{)18}$	$5\overline{)15}$	$6\overline{)36}$	$\frac{50}{50}$
$2\overline{)12}$	$1\overline{)4}$	$5\overline{)20}$	$4\overline{)12}$	$4\overline{)0}$	$1\overline{)5}$	$5\overline{)0}$	$4\overline{)20}$	$4\overline{)8}$	$1\overline{)6}$	$\frac{60}{60}$

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WORKSHEET 6

Demolition Division

Student Name:_____ Date:_____ **CORRECT:** _____

ERRORS: _____

$4\overline{)12}$	$6\overline{)24}$	$3\overline{)9}$	$5\overline{)0}$	$6\overline{)30}$	$1\overline{)6}$	$5\overline{)30}$	$2\overline{)12}$	$3\overline{)18}$	$4\overline{)20}$	$\frac{10}{10}$
$3\overline{)15}$	$3\overline{)12}$	$1\overline{)4}$	$3\overline{)6}$	$5\overline{)15}$	$6\overline{)18}$	$6\overline{)36}$	$1\overline{)5}$	$2\overline{)6}$	$2\overline{)10}$	$\frac{20}{20}$
$5\overline{)25}$	$1\overline{)2}$	$6\overline{)0}$	$4\overline{)24}$	$6\overline{)12}$	$4\overline{)8}$	$5\overline{)10}$	$3\overline{)3}$	$2\overline{)8}$	$4\overline{)0}$	$\frac{30}{30}$
$5\overline{)20}$	$4\overline{)12}$	$5\overline{)10}$	$1\overline{)1}$	$3\overline{)18}$	$5\overline{)25}$	$5\overline{)20}$	$3\overline{)12}$	$2\overline{)8}$	$6\overline{)30}$	$\frac{40}{40}$
$5\overline{)0}$	$5\overline{)30}$	$6\overline{)0}$	$2\overline{)10}$	$1\overline{)5}$	$3\overline{)0}$	$6\overline{)12}$	$1\overline{)4}$	$3\overline{)15}$	$4\overline{)0}$	$\frac{50}{50}$
$2\overline{)12}$	$1\overline{)6}$	$4\overline{)20}$	$5\overline{)15}$	$6\overline{)18}$	$6\overline{)36}$	$4\overline{)8}$	$4\overline{)24}$	$2\overline{)4}$	$6\overline{)24}$	$\frac{60}{60}$

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WORKSHEET 7

Demolition Division

Student Name: _____ Date: _____ **CORRECT:** _____

ERRORS: _____

$9\overline{)54}$	$4\overline{)12}$	$8\overline{)48}$	$7\overline{)42}$	$9\overline{)45}$	$8\overline{)40}$	$2\overline{)8}$	$7\overline{)35}$	$2\overline{)4}$	$9\overline{)36}$	$\frac{10}{10}$
$8\overline{)32}$	$7\overline{)28}$	$5\overline{)10}$	$9\overline{)27}$	$3\overline{)9}$	$8\overline{)24}$	$7\overline{)21}$	$2\overline{)10}$	$9\overline{)18}$	$8\overline{)16}$	$\frac{20}{20}$
$7\overline{)14}$	$9\overline{)81}$	$8\overline{)72}$	$4\overline{)8}$	$7\overline{)0}$	$7\overline{)49}$	$4\overline{)32}$	$6\overline{)48}$	$3\overline{)12}$	$1\overline{)8}$	$\frac{30}{30}$
$9\overline{)63}$	$3\overline{)15}$	$5\overline{)35}$	$6\overline{)42}$	$2\overline{)14}$	$3\overline{)18}$	$1\overline{)7}$	$8\overline{)0}$	$5\overline{)40}$	$4\overline{)28}$	$\frac{40}{40}$
$9\overline{)0}$	$3\overline{)27}$	$4\overline{)24}$	$5\overline{)45}$	$1\overline{)9}$	$4\overline{)36}$	$6\overline{)48}$	$2\overline{)10}$	$7\overline{)63}$	$6\overline{)30}$	$\frac{50}{50}$
$9\overline{)72}$	$2\overline{)16}$	$1\overline{)5}$	$3\overline{)24}$	$7\overline{)56}$	$2\overline{)18}$	$8\overline{)64}$	$6\overline{)24}$	$3\overline{)21}$	$8\overline{)48}$	$\frac{60}{60}$

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WORKSHEET 8

Demolition Division

Student Name:_____ Date:_____ **CORRECT:** _____

ERRORS: _____

7)0	7)49	5)20	9)63	4)20	6)48	7)56	6)30	8)64	9)72	10/10
9)0	3)3	4)36	5)45	6)48	7)63	3)18	3)27	2)18	6)42	20/20
2)14	1)7	3)21	4)28	3)6	5)35	8)48	4)24	8)0	2)16	30/30
3)24	1)9	8)72	5)10	9)81	7)14	6)18	8)16	7)21	9)18	40/40
8)24	9)27	5)15	7)28	8)32	9)36	7)35	2)6	8)40	6)0	50/50
9)45	6)12	7)42	8)48	5)15	9)54	6)36	5)40	1)8	4)32	60/60

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WORKSHEET 9

Demolition Division

Student Name: _____ Date: _____ **CORRECT:** _____

ERRORS: _____

$7\overline{)35}$	$3\overline{)15}$	$7\overline{)63}$	$5\overline{)35}$	$2\overline{)14}$	$3\overline{)12}$	$3\overline{)21}$	$4\overline{)28}$	$6\overline{)42}$	$9\overline{)63}$	$\frac{10}{10}$
$7\overline{)49}$	$2\overline{)0}$	$8\overline{)48}$	$7\overline{)21}$	$2\overline{)8}$	$8\overline{)0}$	$9\overline{)45}$	$7\overline{)42}$	$3\overline{)18}$	$7\overline{)28}$	$\frac{20}{20}$
$8\overline{)32}$	$9\overline{)36}$	$9\overline{)27}$	$9\overline{)18}$	$8\overline{)16}$	$2\overline{)4}$	$8\overline{)72}$	$9\overline{)81}$	$5\overline{)20}$	$6\overline{)48}$	$\frac{30}{30}$
$5\overline{)45}$	$6\overline{)24}$	$1\overline{)9}$	$4\overline{)8}$	$9\overline{)0}$	$6\overline{)12}$	$2\overline{)18}$	$8\overline{)64}$	$9\overline{)72}$	$4\overline{)32}$	$\frac{40}{40}$
$3\overline{)24}$	$2\overline{)16}$	$2\overline{)12}$	$1\overline{)8}$	$6\overline{)48}$	$7\overline{)0}$	$1\overline{)7}$	$3\overline{)9}$	$5\overline{)40}$	$7\overline{)56}$	$\frac{50}{50}$
$3\overline{)27}$	$5\overline{)30}$	$8\overline{)24}$	$8\overline{)48}$	$9\overline{)54}$	$2\overline{)12}$	$8\overline{)40}$	$7\overline{)14}$	$6\overline{)36}$	$4\overline{)36}$	$\frac{60}{60}$

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